Amendments to the Drawings:

The attached sheets of drawings include changes to Figures 2, 3, 5, 6 and 7. These sheets replace the original sheets.

Attachment

PAGE 12/18 * RCVD AT 3/23/2005 2:58:18 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:6104070701 * DURATION (mm-ss):05-02

Remarks/Arguments:

Claims 1-16 are pending in the above-identified application.

The drawings were objected to as including lines, numbers and letters that are not uniformly thick. This ground for objection is overcome in the amended drawing figures submitted herewith.

The specification was objected to for minor typographical errors and because a formula appeared to be inverted. These grounds for objection are overcome by amending the claims as suggested by the examiner. The amendment to paragraph 0013 is supported by paragraph 0056 which shows the formula in its proper form. No new matter is added by these amendments.

Claim 8 was objected to as including informalities. This ground for rejection is overcome in the amended claim 8.

Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) as being anticipated by Akagi et al. This ground for rejection is overcome by the amendments to claims 1 and 2. In particular, Akagi et al. do not disclose or suggest, "an internal combustion engine comprising a first intake valve and a second intake valve per said cylinder, exclusive of any other intake valve, ... wherein the time T is selected to optimize engine torque at relatively low engine speeds commonly used by drivers." Basis for these amendments may be found in the specification in Figs. 6 and 7 and paragraph 0071.

Akagi et al. concerns an intake system for a rotary automotive engine that employs at least three intake valves per cylinder. (See Figs. 2A and 2B, col. 2, lines 23-30 and col. 3, line 67 through col. 4, line 8). Akagi et al. do not disclose the control of the opening and closing of valves of a cylinder of a conventional internal combustion engine. This is relevant to the motivation to combine Akagi et al. and Hitomi et al. as described below. Furthermore, Akagi et al. do not disclose or suggest that the time between the closing of the valves is selected to optimize engine torque at relatively low engine speeds commonly used by drivers. Instead, Akagi et al. disclose that at low load conditions only one intake valve is used, at middle load conditions two intake valves are used and at high load conditions all three intake valves are used. (See col. 5, lines 6-29). Because Akagi et al. do not disclose or suggest these limitations of claim 1, claim 1 is not subject to rejection under 35 U.S.C. § 102(b) in view of Akagi et al.

Claim 2 depends from claim 1 and is not subject to rejection under 35 U.S.C. § 102(b) in view of Akagi et al. for at least the same reasons as claim 1.

Claims 8-11 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Akagi et al. and Hitomi et al. Akagi et al. is described above. Hitomi et al. was cited as disclosing a positive pressure wave and a control unit to actuate valve timing to obtain a resonance supercharging effect. The Hitomi et al. patent concerns a valve control system for a cylinder of an internal combustion engine. Hitomi et al. do disclose two intake valves per cylinder (see col. 4, lines 66-68). Hitomi et al., however, do not disclose or suggest that the intake valves of a cylinder close at different times. In describing the operation of the intake valves, Hitomi et al. consistently use the singular case. From this, the ordinarily skilled person would understand that the intake valves in Hitomi et al. are opening and closing at the same time. While Hitomi et al. do disclose a pressure wave, this pressure wave is caused by a difference in timing between the opening of the intake and exhaust valves (see col. 5, lines 17-21), not by the relative timing of the closing of the two intake valves.

Furthermore, because Akagi et al. concerns a rotary engine and Hitomi concerns a conventional internal combustion engine that does not have a rotary piston, the ordinarily skilled person would not be motivated to combine these references because it is doubtful that the teachings of the operation of a rotary engine could be applied to a conventional engine that does not employ a rotary piston.

Because Hitomi et al. do not disclose any difference in time between the closing of the two intake valves nor any overpressure generated by such timing, because neither Akagi et al. nor Hitomi et al. disclose or suggest selecting the time between closing the valves to optimize engine torque at relatively low engine speed and because the ordinarily skilled person would not be motivated to combine Akagi et al. with Hitomi et al., claim 8 is not subject to rejection under 35 U.S.C. § 103(a) as being obvious in view of Akagi et al. and Hitomi et al. Claims 9-11 depend from claim 8 and are not subject to rejection under 35 U.S.C. § 103(a) in view of Akagi et al. and Hitomi et al. for at least the same reasons as claim 8.

Claim 16 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Akagi et al., Hitomi et al., and Pischinger. Akagi et al. and Hitomi et al. are described above. Pischinger concerns an internal combustion engine having two intake valves 2 and 3 in which one of the intake valves may be closed by a flap 11 when the engine is operating at low speed. (See col.

4, lines 45-48). Pischinger focuses on the timing of the opening of the intake valve or valves. (See col. 4, lines 49-58). Pischinger does not disclose or suggest any difference in timing of the closing of the two intake valves. Thus, Pischinger can not disclose or suggest controlling this timing to optimize engine torque at relatively low engine speeds, as required by claim 8. Because Pischinger does not disclose or suggest the material that is missing from Akagi et al. and Hitomi et al., claim 8, and claim 16 which depends from it, are not subject to rejection under 35 U.S.C. § 103(a) in view of Akagi et al, Hitomi et al., and Pischinger.

Applicant gratefully acknowledges the statement in the Office Action that claims 3-7 and 11-15 would be allowed if rewritten to be independent in form and to include the limitations of their base claims and any intervening claims. Because, as set forth above, amended claims 1 and 8 are not subject to rejection in view of the cited references, no amendment to claims 3-7 and 11-15 is needed.

The prior art made of record but not applied has been considered but does not affect the patentability of the subject invention.

In view of the foregoing amendments and remarks, Applicants request that the Examiner reconsider and withdraw the objection to the drawings, the objections to the specification, the objections to claims 3-8 and 11-15, and the rejection of claims 1, 2, 8-10 and 16.

Respectfully submitted,

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Attachments: Figures 2, 3, 5, 6 and 7 (3 sheets)

Dated: March 23, 2005

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I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office (1-703-872-9306) on the date shown below.

March 23, 2005

Tonya M. Berger